Activity description

Use this activity to check what percentage methods students use, and to encourage them to use efficient multiplier methods.

Suitability

Level 3 (Advanced) at the start of a course which includes the use of percentages
or Level 2 (Intermediate/Higher)

Time

1–3 hours according to students' prior knowledge, and how much reinforcement of efficient methods is needed.

Resources and equipment

slideshow, graphic calculators and Excel (optional).

Key mathematical language

Per cent, interest, invest, shares, depreciation, multiplier, index, share issue, shareholding.

Notes on the activity

The first two pages of the student sheets include a variety of questions involving percentage changes. Students, preferably working in pairs or small groups, can be asked to answer as many of these as they can in a fixed time.

The aim is to allow you to find out what methods students use when working with percentages.

You may not need to use the rest of the activity if the students are all using the most efficient methods and getting the correct answers!

If this is not the case, the slideshow can be used to compare different methods, encourage class discussion about them, and show how quickly solutions can be found if a multiplier is used.

The information sheets give some worked solutions, whilst leaving other parts for students to complete.

As well as discussing the solutions, you could discuss how realistic assumptions are, such as a constant rate of depreciation.

Once students have completed the information sheets, they could keep them as a set of notes to provide a reminder of the different methods.

During the activity

Working in pairs or small groups would encourage students to share prior knowledge and ideas. Different groups could be asked to work on different questions. They could then feed back their solutions to the rest of the class.

Points for discussion

Ask students to compare methods and choose the most efficient method. Ensure that students know how to use their calculators to do repeat calculations and work with indices.

Extensions

Mixed questions from a Higher GCSE Maths textbook to practise new methods (if needed).

Answers

Introduction

1 Amount in account at the end of 5 years = £3649.96

2a Value of car after 5 years = £7099. **b** Value after 20 years = £620

3 Sales after 6 years = 31 000 (nearest 1000)

4a Shareholder will have 1545 shares.

b This is 77.25% of her original shareholding

5 Shop loses 2.5% on goods sold in the sale

6 Price of train fare before rise = £64.80

7 Price of insurance before discount = £29.60

Compound interest repeated calculation (page 3)

Try this A

£5970.26

End of year n	Amount (£A)
0	3000.00
1	3120.00
2	3244.80
3	3374.59
4	3509.58
5	3649.96

Depreciation repeated calculations (page 5)

Value after 20 years = £620 assuming the rate of depreciation remains the same.

Age of car (n years)	Value (£A)
0	16000
1	13600
2	11560
3	9826
4	8352
5	7099

Try this B

1 Formula for sales n years from now = $0.94^n \times 45\,000$

2 Estimated sales 6 years from now = 31 000 (nearest thousand)

3 Check using repeated calculations.

Number of years n	Estimated sales
0	45000
1	42300
2	39762
3	37376
4	35134
5	33026
6	31044

Try this C

The shop makes a 2.5% loss on goods it sells in the sale.

Try this D

Cost before discount was £29.60.